INDEPENDENT OVERSIGHT BASELINE ASSESSMENT OF THE EFFECTIVENESS OF SAFETY AND SECURITY MANAGEMENT PROGRAMS WITHIN THE DEPARTMENT OF ENERGY

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EXECUTIVE SUMMARY

This report evaluates Department of Energy (DOE) performance in 1995 in implementing the Secretary's guiding principles for safety and security management. In October 1994, in an effort to provide clear program objectives, the Department identified five basic principles by which DOE must operate. These principles are:

- Line managers are responsible and accountable.
- Comprehensive requirements exist, are appropriate, and are executed.
- Competence is commensurate with responsibilities.
- Independent oversight of Department activities is conducted.
- Enforcement of public laws, international treaties and other legally binding instruments is assured by DOE.

The first three of these principles form the basis for all evaluations conducted by the Office of Oversight. Within the Office of Environment, Safety and Health, the Office of Oversight is an independent, multidisciplined entity that has been in existence little more than a year. In this time, the Office has instituted a site residents program that has conducted over 200 real-time surveillances; conducted numerous inspections, special studies, and reviews; and developed a comprehensive set of site profile information. The results of these activities form the basis for this report and its conclusions.

In the past year, significant changes occurred within DOE in response to changes in mission, priorities, and resources. The DOE underwent a realignment that fostered acceptance and understanding of DOE's new priorities. However, the realignment is not yet fully institutionalized, leading to confusion regarding assignment of line management responsibilities. In 1994, the Functions, Assignments, and Responsibilities (FAR) Manual was published, requiring each secretarial officer and field element manager to provide to the Secretary a statement of compliance with the FAR Manual or to take remedial actions to bring their operations into compliance. Although this action marked a commitment to the first of the Secretary's guiding principles, initial responses were not complete and required followup by the Office of Oversight to assure implementation.

In 1995, DOE faced many changes in the manner and types of operations, as well as many changes in how it specified requirements for management and operations. Specifically, DOE undertook a concerted effort to streamline and reduce requirements, along with changing the manner in which requirements are stated. DOE is moving away from detailed requirements, toward general guidance that states overall objectives or goals. The effort to reduce the complexity and bureaucracy of the existing requirements has merit; however, the revision of policies and requirements, not long after the publication of several ES&H orders and proposed rules, has led to uncertainty in the field with respect to implementation. In some instances, this has led DOE employees and contractors to believe that all requirements are negotiable, thereby impacting the implementation of the Secretary's second guiding principle. On the other hand, some field elements have taken positive steps toward developing site-specific guidance, procedures, policies, and work controls to ensure safety and security.

Another area in which DOE faces change is staffing and personnel. As many of the scientists and engineers responsible for design, maintenance, and operations leave the DOE complex, a means for capturing and maintaining the needed expertise continues to be a challenge. Moreover, as the mission of DOE moves away from operations and toward decontamination and decommissioning, different areas of technical expertise are required. These inevitable transitions, combined with increasing criticism of the competence of DOE's workforce, give priority to the implementation of the Secretary's third guiding principle. Several DOE organizations have acknowledged the need to train and qualify their staff, and many field elements are implementing more matrixed management practices so that personnel with needed skills can be used wherever they are needed. These efforts

are showing some positive results, although many are still in their infancy. This area continues to be of concern to DOE, as well as the Defense Nuclear Facilities Safety Board.

Overall, the implementation of the Secretary's guiding principles has led DOE to a better understanding of how implementation directly impacts safety performance. Individuals responsible for implementing safety have become more focused, as reflected in DOE's improving safety awareness and performance. While there have been some improvements in safety and security management, DOE remains plagued by issues such as poor facility condition, inadequately evaluated or documented authorization bases, and limited management controls. Confusion about roles and responsibilities, as well as requirements, has slowed the course of safety improvements to date, and implementation of corrective actions for identified problems has not always been aggressive. In many instances, problems associated with these activities have been offset by knowledgeable personnel. However, lacking institutionalization of these activities, related problems are likely to become more prevalent as DOE continues to transition its operations and workforce.

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1.0 INTRODUCTION

BACKGROUND

The Department of Energy is undergoing significant change in response to new mission needs, priorities, and resource constraints.

Significant changes are occurring in the Department of Energy (DOE) in response to new mission needs, priorities, and resource constraints. However, the challenges of cleaning up the legacy of more than forty years of nuclear weapons production-related activities cannot be underestimated. Safety and security management must deal with the challenge of aging, contaminated facilities that must now be decommissioned and dismantled or otherwise be made safe for workers, the environment, and the public while supporting the remaining operational requirements placed on DOE. As facilities that were once used for production are being dismantled or converted to other purposes and the sites environmentally restored, hazard identification and minimization are principal considerations DOE-wide. At the same time, DOE continues to conduct nuclear stockpile verification and to store special nuclear material, including nuclear weapons and devices. The absence of production operations at most DOE sites lessens one taxing security requirement—protecting and accounting for special nuclear material in the dynamic environment of a production line. However, the protection of special nuclear material and the large volume of classified weapons data and other classified matter continues to require significant management attention and effort. Dismantlement, conversion, and environmental restoration activities, along with the normal evolution of the DOE work environment such as increased use of large computer system networks, present new challenges to security systems designed to address traditional concerns and modes of operation.

To better evaluate the effectiveness of the Department's safety and security management programs in an era of change, the Office of Oversight was formed.

To better understand the performance of safety and security management programs in this changing and challenging environment, the Secretary of Energy assigned sole responsibility for all independent oversight of DOE to the Assistant Secretary for Environment, Safety and Health. In late 1994, the Assistant Secretary for Environment, Safety and Health created the Office of the Deputy Assistant Secretary for Oversight, thereby consolidating all independent oversight functions in one office. The mission of this office is to provide independent information and analysis needed to ensure that the Secretary, DOE and contractor managers, and the public have an accurate, comprehensive understanding of the effectiveness, vulnerabilities, and trends of policies and programs pertaining to environment, safety, and health (ES&H) and safeguards and security. The benefit of maintaining a single independent oversight organization is realized in its ability to provide a unified, integrated view of safety and

security across the DOE complex, thereby assisting DOE in focusing on the most pressing safety problems.

PURPOSE AND SCOPE

This report evaluates safety and security management during the first year of Office of Oversight activities.

This report presents an evaluation of DOE safety and security management relative to a set of guiding principles identified by the Secretary, providing a baseline of the Department's current performance against which to compare future activities. In its first nine months, the Office of Oversight performed four comprehensive inspections, seven reviews, five special studies, and more than 200 site surveillances at facilities throughout the DOE complex.[1] These are identified in Appendix A. This evaluation combines the data obtained during all of these activities, as well as information contained in the site profiles,[2] to provide this Department-wide perspective.

METHOD OF EVALUATION

The Secretary of Energy has outlined five principles to guide Departmental safety and security management.

Numerous studies have shown that the essential characteristic of successful programs and projects is the understanding and appreciation of the need for an effective management system that will ensure adequate control over all aspects of the program or project. In 1994, the Secretary of Energy forwarded to the Congress and to the Defense Nuclear Facilities Safety Board the principles that DOE deemed necessary for an effective safety management program. As a basis for DOE's independent, internal oversight of safety and security programs, the Office of Environment, Safety and Health has formulated a conceptual framework that centers around these fundamental management principles, characterizes these principles, and establishes criteria to evaluate their implementation. The principles identified by the Secretary are:

[1] Inspection activities are comprehensive in that they consider many technical topics at a single DOE field office or site. Reviews and special studies often focus on analyzing a single issue for a number of sites. Surveillances are formal assessments conducted by the ES&H Residents stationed at key sites and facilities throughout the DOE complex.

[2] Site profiles describe, for key sites across the DOE complex, the general site characteristics, information on key facilities and key ES&H issues, and an overall evaluation of the effectiveness of ES&H programs. Key facilities include the activities and/or operations that are the most significant from an ES&H perspective; the facilities discussed in the profile are intended to be representative of activities and/or operations across a site. Site profiles provide a unified and integrated view of safety at a site.

- Line managers are responsible and accountable for safety and security management.
- Comprehensive requirements for safety and security management exist, are appropriate to the need, and are executed by line managers.
- The competence of each person is commensurate with assigned responsibilities.
- Independent oversight of Departmental activities is conducted to assess the status of safety and security management.[3]
- Enforcement of public laws, international treaties, and other legally binding instruments is assured by Departmental management.[4]

The first three principles are used to evaluate safety and security management programs; the remaining two mandate inspection and enforcement.

Of these five guiding principles the first three—line management responsibility, comprehensive requirements, and competence commensurate with responsibilities—are used to evaluate safety and security management, since they directly involve DOE line management. Independent oversight, as described in the fourth principle, is the function of the Office of Oversight, while enforcement is currently retained as a function of the Assistant Secretary for Environment, Safety and Health. Each of the guiding principles is a crucial element in fulfilling DOE's mandate to provide "reasonable assurance that safety and health risks of operating personnel and the public be minimized" and to provide "independent oversight of the Department's Safeguards and Security Program." These principles and their associated criteria (see Appendix B) are used to evaluate the effectiveness of safety and security management programs; the process requires careful consideration of the nature of the specific activity or facility being reviewed, its relationship to and impact on other activities and facilities, its life cycle phase, and the risk the activity presents to ES&H and security goals. The evaluation of safety and security management programs presented herein considers the guiding principles both individually and in concert, and the extent to which they are integrated into the organization's activities.

2.0 RESULTS FOR FISCAL YEAR 1995

[3] DOE's fourth guiding principle—independent oversight—is not evaluated in this baseline assessment, because the activities reported herein are a partial fulfillment of that requirement. The requirements levied on the Office of Oversight by the Secretary are described in an October 1994 letter to the Chairman of the Defense Nuclear Facilities Safety Board, and a January 1995 reply to the United States Congress in response to *Amendment 2171 to the National Defense Authorization Act* .

[4] The effectiveness of enforcement is not evaluated in this baseline assessment, since details of its application are under development. The Atomic Energy Act gives DOE authority to enforce compliance with its safety and security requirements, and the 1988 Price-Anderson Amendment Act to the Atomic Energy Act authorizes DOE to levy civil penalties upon its indemnified contractors. DOE is developing rules to invoke the Price-Anderson legislation and is restructuring its system of orders, which express Departmental requirements.

The Secretary's guiding principles provide the framework for the evaluation results presented in this report by the Office of Oversight.

Office of Oversight results are presented in accordance with the Secretary's first three principles.

PRINCIPLE 1 - LINE MANAGERS ARE RESPONSIBLE AND ACCOUNTABLE

The first principle is that line managers are responsible and accountable for safety and security.

DOE has long maintained that line management has the primary responsibility for safety and security. Line management accountability and responsibility for safety and security have been addressed specifically in Departmental directives, including Secretary of Energy Notices and Secretarial Memoranda. In particular, Secretarial Memoranda have required compliance with DOE's *Manual of Functions, Assignments, and Responsibilities for Nuclear Safety*,[5] commonly called the "FAR Manual." This Office of Oversight's review of DOE's application of the Secretary's first guiding principle yielded the following conclusions:

- Although DOE and contractor managers demonstrate an increased understanding of the importance of identifying roles and responsibilities for safety and security management, these roles and responsibilities often are poorly defined and communicated, and not effectively institutionalized.

- DOE still fails to demonstrate a culture wherein line managers are held accountable for safety and security performance.

These conclusions are discussed below.

Line Manager Roles and Responsibilities for Safety and Security Management

Benefits are evident when field office and contractor managers establish clear lines of authority and responsibility.

At some sites, management has made efforts to instill sound safety and security management practices, including strategic planning, rigorous program management, development of performance measures and safety- and security-oriented procurement procedures, and implementation of more disciplined operations, including detailed task planning. The success of the programs at such sites highlights the importance of sound program management practices.

At some sites, both the DOE field office and the contractor have established clear lines of authority and responsibilities. The benefits are evident in the contractors' initiatives to establish safety policies and to communicate these policies within their line organizations. Beyond the general benefit of introducing a safety culture by establishing these responsibilities, workers have been able to control work process hazards through a direct stop-work authority, giving them an individual sense of ownership safety. In areas such as the startup of new facilities, management has taken a proactive approach to setting safety policies, goals, and objectives so that operations

[5] The FAR Manual identifies the roles and responsibilities of DOE personnel regarding the implementation of nuclear safety principles, including the assignment of responsibilities and accountabilities to senior DOE management, Headquarters program officers and personnel, and field element managers and personnel.

are undertaken in a disciplined manner from the outset. Other effective means observed for instilling line management responsibility include management visibility in the workplace, the establishment of safety committees, the inclusion of safety performance objectives in some senior managers' personnel evaluations, and the use of safety risk data as input to all management and resource decisions. In the area of security, noticeable accomplishments have been made in consolidating special nuclear materials and, in some cases, reducing the inventory of these materials maintained on site. A clear policy and approach by the Department regarding special nuclear materials is responsible for these actions.

At other sites, however, line management staff commented that not only were safety management responsibilities not clearly assigned, but that the FAR Manual was not being appropriately used. Some stated that there was even further confusion about the interface between DOE and contractors. Some field personnel viewed their role as assistance to the contractor, risking a loss of their objectivity with regard to safety performance. Security roles and responsibilities were better defined, but the assumption of a field assistance role brings into question the objectivity of DOE security management as well.

However, roles and responsibilities are often not clearly communicated or understood.

In almost every Office of Oversight evaluation, issues arose concerning the roles of Headquarters, local DOE line management, and contractor line management. Lack of clarity, misunderstanding, or miscommunication of roles and responsibilities was generally noted. As one descends the management chain, clarity and communication of roles and responsibilities steadily decline.

Confusion is especially evident regarding responsibilities for subcontractors.

Confusion was especially evident regarding the safety responsibility for subcontractors. In some cases, contractors stated that they were not responsible for subcontractors' unsafe practices, nor were they responsible for the safety of subcontractor employees working on site. Such attitudes indicate a misunderstanding of personal and corporate responsibilities for safety that require immediate senior management attention.

The Secretary's realignment initiatives are not always implemented.

A basic concern regarding roles and responsibilities is the interface between Headquarters and field office line management. Problems with this interface are reflected in the inconsistent implementation of the Secretary's realignment initiative. In this initiative, the Secretary consolidated all oversight activities under the Assistant Secretary for Environment, Safety and Health, and transferred many operations from Headquarters program offices by delegating more authority to the field office managers. However, these changes have left many Headquarters program offices confused about what their responsibilities are with regard to safety/security and mission objectives, and how to discharge those responsibilities. This confusion has led many Headquarters program office personnel to continue with the same actions they performed before the realignment, and to employ the same techniques to assure mission and safety/security objectives, through such means as audits. The continuation of these audits has yielded further confusion in the field regarding their interface with a variety of Headquarters organizations, and a continued concern that DOE is still engaged in a process of multiple audits.

Although the FAR Manual defines and assigns roles and responsibilities for safety, aggressive followup by the Office of Oversight was necessary before senior managers acknowledged and accepted their responsibilities, despite Secretarial emphasis. Since that time, many revisions to existing requirements and orders have necessitated updating the FAR Manual to retain its usefulness. Efforts to update the FAR Manual are especially important because DOE's implementation of rulemaking will leave the FAR Manual as the remaining source for defining responsibilities and authorities. In the absence of a fully current and comprehensive FAR Manual or some other Departmental definition of roles and responsibilities, management will continue to default to past practices in order to fill the void.

Headquarters guidance is not adequate to clear up the confusion.

Line Management Accountability for Safety and Security

As reflected in several inspections and surveillances, one troubling aspect of the Secretary's first guiding principle is the lack of management accountability once safety or security problems are identified. In the absence of accountability, events may be inadequately investigated; as a result, problems may recur, field and area offices may not recognize and rectify overdue corrective actions, and local offices may not be able to assess contractor performance effectively. For example, during one surveillance it was noted that although a criticality alarm system has failed to meet requirements for nearly ten years, the field office had not yet obtained contractor compliance. Another instance involved longstanding problems regarding compliance with operational safety requirements and the implementation of the criticality safety program. These issues were noted but never brought to closure by DOE, and this lack of followup ultimately resulted in a Defense Nuclear Facilities Safety Board recommendation. In other instances, DOE and contractor line management failed to adequately assess safety program performance, thus contributing to the infiltration of suspect/counterfeit parts into facility safety systems. Similar results are found in security. At some sites, known deficiencies in physical and information security systems have remained with little action taken towards resolution.

Management accountability for resolving identified issues remains a concern.

Secretarial initiatives have helped encourage cultural change in senior DOE management's attitude toward safety and security management accountability. However, simple acceptance of accountability for safety and security management throughout all management levels is insufficient. Some managers retain a rather discretionary approach to implementing requirements, and the lack of censure accompanying non-compliance with requirements persists. Much remains to be done in both safety and security before DOE can be fully satisfied with the degree of responsibility and accountability acknowledged and accepted by Departmental line management.

Departmental management needs improvement in fully accepting the necessary degree of responsibility for solving safety and security problems.

PRINCIPLE 2 - COMPREHENSIVE REQUIREMENTS

While the need for appropriate requirements and the consistent implementation of these requirements is one of the most important principles identified by the Secretary, difficulties in developing and implementing appropriate standards and requirements continue to plague DOE. These difficulties have been recognized by DOE, the National Academy of Sciences, the Defense Nuclear Facilities Safety Board, and the United States Congress. The need for DOE to clearly state its expectations for the safety and security of operations cannot be overemphasized. These expectations must be expressed in a form that will endure transitions of contractors, DOE employees, and facility missions. The Office of Oversight's observations regarding implementation of the Secretary's second guiding principle yielded the following conclusions:

The Department must state its expectations for safety and security clearly, and in a form that will endure the transition of its work and workforce.

- DOE policy, requirements, and guidance must be clearer and more consistent in both content and implementation. DOE is moving toward a standards-based safety management program approach.

- Significant deficiencies are evident in the understanding and documentation of the facility authorization basis, including hazards analyses and current facility configurations.

These conclusions are discussed below.

DOE Policy, Requirements, and Guidance

While DOE has always promulgated policy, requirements, and guidance, these efforts have been inconsistent, not only in the manner of promulgation but also in the intended objectives. For example, in the early 1990s, following reviews by the National Academy of Sciences, Congress, and the Defense Nuclear Facilities Safety Board, the discipline of operations within DOE was seen as so insufficient that DOE moved to establish more detailed requirements and provide consistency in safety of operations across the DOE complex. When these requirements neared implementation, contractors, laboratories, and DOE program offices voiced concerns that these detailed requirements were too inflexible to manage the diverse operations of DOE. As a result, DOE began to step away from specific requirements and move toward using more general guidance to describe DOE's goals.

Policy, requirements, and guidance have tended to be either highly detailed, limiting their flexibility, or fairly general, allowing variable interpretations.

The criticism of DOE's lack of discipline in operations was valid, as is the recognition that DOE's requirements must accommodate diverse operations. However, DOE's treatment of these two problems as separate objectives has led to misunderstanding of the importance of the Secretary's second guiding principle and its impact on safety and security. So extensive were the criticisms of DOE requirements within DOE that many responsible for imposing these requirements on operations began to doubt their importance and, as a result, concluded that compliance with requirements was not mandated. The result is that in some cases observed by the Office of Oversight, managers do not implement requirements unless they agree with them, managers may ignore requirements seen as a hindrance to the mission, and requirements may be viewed as negotiable.

Inconsistency in requirements implementation diminishes the ability of Departmental managers to perform some of their duties.

Inconsistency in the implementation of requirements is readily seen in programs such as DOE's incident reporting system. Although some sites provide complete data to this system, others provide only limited information that is of little use to DOE or other interested parties. The inconsistent information provided through DOE's reporting system has direct bearing on DOE's ability to discharge its management duties. For example, in the Oversight evaluation of suspect/counterfeit parts, conclusions about the extent of suspect/counterfeit parts in use within DOE were impacted by the quality and availability of data provided through the reporting system. Even the accuracy of our nuclear materials inventories has been compromised by the use of inventory and measurement systems that fail to consistently implement requirements.

Similarly, security policy has varied over the years in its specificity as to requirements and inconsistency in implementation is common. The observed security implementation inconsistencies with greatest programmatic impact are in the preparation and approval process for Site Safeguards and Security Plans. In addition, promulgation of important baseline data, such as consequence values to be used in the risk analysis, in non-binding guides leads to further inconsistencies, since there is no field consensus concerning which values to use.

The simultaneous policy initiatives over the past year, including efforts to clarify and reduce requirements and establish the "necessary and sufficient" process, combined with the mandate to continue to comply with existing orders, have created confusion and led many field managers to implement revised requirements rather than existing ones. DOE needs to provide more detailed direction during the phase-in period of revised requirements. More importantly, DOE must provide clear requirements and a long-term plan for their implementation. Without such an approach, initiatives to revise these directives will continue to address the need for and implementation of requirements in a piecemeal fashion, causing confusion that will continue to adversely impact the safety and security of operations.

The need for clear requirements and a consistent policy on implementation has never been more critical than it is today. The continued changes in mission, workforce, and the types of hazards being faced make it imperative that DOE define its safety and security objectives and requirements in a manner that is clear, traceable, retrievable, and retainable. This need is

In today's changing environment, the need for clear requirements is especially pressing.

emphasized by observed safety problems with subcontractor and privatization activities. In these relationships, each party must know the safety requirements that apply to their activities and who is responsible for the safety of those activities. In several surveillances and inspections, the Office of Oversight noted that problems with privatization had much to do with a lack of understanding of DOE's safety requirements and the responsibility for their implementation. On the other hand, at many sites, appropriate implementation of required measures was found, even in the absence of formalized Departmental guidance; local guidance, standards, and procedures served as the authoritative source documents when Headquarters guidance was confusing or incomplete. However, while these initiatives addressed near-term safety issues, they often lacked a comprehensive and long-term perspective, and thus did not address the issue of consistent standards for safety across DOE.

The observed lack of clear Departmental requirements has resulted in several incidents. For example, the investigation of a training-related fatality in 1995 identified, as a contributing factor, line management's lack of understanding for the need to review hazardous training activities such as rappelling. In another instance, because of a concern that large monetary penalties could be levied on DOE due to a fixed-price subcontractor effort, DOE failed to correct safety problems; in this particular case, DOE was uncertain about its role. In 1994, when nuclear-related equipment was sold and then repurchased from an inappropriate buyer, an Office of Oversight review concluded that the primary cause was a lack of DOE policy on applicable export control regulations. In this time of major change, experience dictates that vigilance in defining, documenting, and implementing safety and security requirements is crucial. At present, understanding and implementation of requirements in particular remain inadequate. If this situation persists, the Secretary's second guiding principle cannot be fully implemented.

The developing standards-based program approach, along with pending provisions for enforcement, will promote progress in this area.

Despite significant problems in the area of requirements, DOE is making some progress in resolving these concerns. At the field level, some sites are addressing the problem of safety requirements implementation by incorporating into their policy organizations the responsibility for researching, identifying, evaluating, and disseminating appropriate requirements for inclusion in site and facility specific procedures and operations. Some sites do recognize the need for implementation of safety requirements and are moving toward an integrated, standards-based safety management approach. These efforts have resulted in several cases where a good system for understanding the needed requirements at the facility level was evident. This, combined with the use of performance measures to assess the implementation of safety requirements and objectives, shows promise for resolving current deficiencies.

At the Headquarters level, DOE is developing a more disciplined approach to operations and a more enduring means for defining how operations should be conducted through its implementation of a standards-based safety program. DOE has also formed a standards committee with broad participation across the DOE complex. The participation of senior managers also adds to the effectiveness of this forum and aids in reaching

consensus across the DOE complex. In addition to the standards-based safety program, DOE is emphasizing implementation of enforcement requirements through policies and the Price-Anderson Amendment Act. In security, Headquarters actions are less effective in addressing the inconsistencies in implementation. Recent changes in orders and other direction and guidance have not significantly clarified requirements. Headquarters security expertise has recently been consolidated in the Office of Safeguards and Security, partially to address these issues.

Authorization Basis Deficiencies

The authorization basis consists of the documents and analyses needed to make decisions about what operations can safely be performed in a facility.

The concept underlying the authorization basis requirement is that the potential hazards associated with operations during normal and "credible accident" conditions must be analyzed in order to ensure that facility operations are safe. In addition, the ability of the facility structure, safety systems, and procedures to deal with such hazards must be determined. From this information, the "bounding conditions" or assumptions about what can safely be done in a facility are developed. Safety analysis reports formally document these analyses, assumptions, and bounding conditions, and constitute the primary source of the authorization basis. Discipline and safety of operations depend on defining, understanding, and documenting the facility-specific authorization basis.

Developing a reliable authorization basis for every facility is one of the Department's most urgent needs.

Today, most facility hazards are not yet well defined, and most facility configurations are poorly understood and documented. Consequently, developing an authorization basis for each facility is one of the most important needs within the DOE complex. The authorization basis underlies every decision about what can be done safely within a facility by describing the conditions and parameters that assure that acceptable limits are not exceeded. Furthermore, it guides development of procedures, methods of operation, and facility design. Lacking a definitive authorization basis, facility management cannot count on having an authoritative understanding of safety. Problems with the authorization basis have been raised in each comprehensive inspection and in some special studies and reviews.

Deficiencies in facilities' authorization bases have broad consequences for a variety of safety-related decisions.

In the best case encountered, DOE field site management had provided clear guidance for updating and maintaining the authorization basis, and although the contractor at that site has not yet completed this task, a comprehensive, updated authorization basis consistent with requirements was well on the way. In three other cases, the authorization basis was found to be poorly understood, incomplete, and out of date, and no immediate corrective action had been defined. Where current hazard analyses exist, they are being used effectively to support operational controls and management actions to ensure safety. Accurate identification of hazards and the development of appropriate work practices and procedures have been effective in controlling personnel exposure to radiation and asbestos and in minimizing the generation of hazardous and non-hazardous waste. Where hazard analyses do not exist or lack rigor, day-to-day operations and work planning are impaired. Several surveillances have noted poor work planning attributable to an inadequate authorization basis; some instances resulted in imminent danger. Operational readiness reviews are another activity for which a

documented authorization basis is vital. When a review team must conclude whether it is safe for a facility to resume operations, the hazards must be clearly defined and the facility's current configuration well understood. These conclusions have not always been founded on complete and sound data. A comprehensive, current authorization basis and its associated hazards analyses are also vital to the planning and safe execution of decommissioning and decontamination activities throughout DOE.

The corresponding security-related documents need to be updated.

Likewise, safeguards and security plans assess potential threats to the security interests at the site and provide the basis for determining whether adequate safeguards and security exist; they are analogous to authorization basis documents for safety. In particular, the Site Safeguards and Security Plan is mandated for sites containing significant quantities of special nuclear material or presenting significant industrial, radiological, and/or toxicological sabotage potential. An initial set of Site Safeguards and Security Plans is now complete, following nearly ten years of DOE Headquarters emphasis and Congressional scrutiny. However, many of these plans have not been updated to reflect changes in facility operations and security interests. Recent Departmental actions to meet the deadline for completion agreed upon between DOE and the United States Congress have resulted in incomplete review and flawed presentation of accepted risk. Security inspections have identified this shortcoming.

The consistent deficiencies in defining, understanding, and documenting hazards, threats, and facility configuration information reflect a persistent lack of discipline and formality of operations within DOE. This lack has left a void in facility authorization bases and continues to impede the retrievability and retention of safety information. Moving toward a more disciplined approach to safety and security management remains a challenge and is paramount in this time of transition.

PRINCIPLE 3 - COMPETENCE COMMENSURATE WITH RESPONSIBILITY

Attracting and retaining personnel with the necessary specialized skills will remain a pressing concern for the Department.

As the transitioning of DOE's mission and workforce accelerates and DOE's facilities continue to degrade, the need for qualified technical resources, especially in safety disciplines, becomes more pressing. This need is exacerbated by the difficulty of attracting and retaining personnel, as well as by the limited number of individuals seeking careers in nuclear-related professions. While DOE's mission is much broader than nuclear operations, the legacy of weapons production, disarmament, and now dismantlement and cleanup of the DOE complex requires extensive knowledge of nuclear-related sciences. The need to document and retain existing expertise is also increasingly important, heightened by DOE's historically casual approach to maintaining safety documentation and its past reliance on the knowledge of individual staff members. While the qualifications and competence of DOE's workforce have been under intense scrutiny and are often cited as a factor in the inefficiency of DOE's safety management programs, DOE is identifying the extent of the problem and seeking improvements. The Defense Nuclear Facilities Safety Board considers personnel competence to be one of DOE's most important issues. The Office of Oversight's

observations regarding implementation of the Secretary's third guiding principle yielded the following conclusions:

- Insufficiency of competent staff tends to be confined to certain disciplines or facilities rather than a pervasive sitewide issue.

- The training and qualifications of the DOE workforce are not receiving adequate management emphasis, especially since a transitioning workforce compounds deficiencies in resources and skills. Experienced staff who are competent in one or more specialized disciplines or skills cannot automatically be transferred to new areas of work without some retraining.

These conclusions are discussed below.

Sufficiency of Competent Staff

Several approaches for optimizing the use of personnel with specialized skills have been tried, with mixed results.

Maintaining a qualified and competent workforce in this period of transition within DOE, and within the government, remains a challenge. Some sites have addressed this issue by placing experienced personnel in field and facility management positions, and by using matrix management techniques to allow the broader use of competent staff as needed in various disciplines and/or facilities. The use of experienced senior managers has worked quite well because their backgrounds often complement the specific skills and knowledge needed at the staff level. With matrix personnel, formal and informal techniques have been established and successfully applied to prioritize personnel movement among facilities and tasks, thereby helping to minimize the impact of skill shortages. However, the matrixing of personnel has not been without problems; moving personnel requires both the support of human resources and the approval of labor relations. Some managers have resisted matrixing by trying to retain good employees for their sole use. Others have impacted the long-term viability and competence of matrixed personnel by interpreting quite narrowly who should be included in training and qualification programs. For example, managers have suggested that programs to enhance the skills of personnel apply only to defense nuclear facilities and their staff, thereby excluding temporary personnel, such as those provided through matrixing. Site management has seen the shortsightedness of this approach and is seeking other ways to reshape the workforce to meet future needs.

Despite some positive practices, there remain some concerns about whether workers' skills are evaluated appropriately.

Some very positive practices related to technical competence were noted at some sites. For example, at one site there were notable achievements in workers' understanding of workplace hazards. In particular, decontamination and decommissioning activities at that site were found to be well planned, and the use of dedicated crews enhanced personnel competence. In such cases, both the planning and the competence of the personnel increased the safety and efficiency of work activities. In other cases, however, workers' experience in areas other than those in which they are currently employed was used inappropriately to judge their skill level. For example, when experienced reactor operators and machinists were assigned to other tasks, such as decontamination or decommissioning, their previous

experience was used as a substitute for the specific skills and training needed in their current work assignments. Even when enough workers with appropriate expertise and experience are available outside but not inside the facility, there has been a tendency to depend on the facility's existing capabilities. This is especially true when security requirements constrain the employment of replacement personnel.

Training, Qualification, and Workforce Transitioning

A systematic approach is needed to identify training needs and priorities.

Current DOE efforts to ensure that a competent workforce is maintained need to be accelerated. Effective recruitment strategies have yet to be implemented. These are particularly important because many senior site personnel are relatively new to their current positions, and personnel turnover is high. At many sites, managers understand the importance of training and have made strides in certain areas (such as effective training and certification programs for the Facility Representatives program). However, most training programs have not been founded on a systematic approach. At sites where the adequacy of training programs varied from facility to facility, the problem is being addressed by consolidating appropriate aspects of training into a systematic, sitewide program. Another difficulty resulting from not

having a systematic approach to training is the inability to set appropriate priorities for training based upon safety needs and resource constraints.

Training programs require management attention to assure that they are designed to support continuing staff competence as needs evolve.

Training programs today face the additional challenge of maintaining the technical competence of the workforce throughout facilities' life cycle. Even when staff are competent, the existing training programs fall short of assuring their continued competence. In some instances, training is weak because training personnel lack the clearance to present course materials that address real problems. When facility hazards and current conditions are not well documented, practical training can be one of the few means left to help personnel prepare for the range of problems they might experience in the field. Training programs are usually adequate in areas where the required experience is easily obtainable from, and transferable to, the private sector. However, training was found to be insufficient in areas having limited application skills or in specific disciplines for which commercial demand is relatively low, such as criticality safety. In addition, the results of several surveillances showed that some of the most basic worker safety training, such as proper respirator use, was sometimes overlooked. Training or apprenticeship programs also appear to be suffering from a lack of management emphasis.

A long-term training perspective is crucial.

As new requirements emerge, or new areas of Departmental emphasis are identified, experienced personnel must be trained and qualified in new subject areas. Many experienced personnel are near the end of their careers. Current plans envision retraining these individuals to address emerging needs and shifting priorities. Although this approach will meet near-term needs, retraining a transitioning workforce can diminish the long-term sustainability of operations, because these individuals are likely to leave the DOE complex in the near future. There is no discernable current effort directed toward addressing more long-term needs.

3.0 CONCLUSIONS

Improvements in safety and security management must continue.

The Department's overall performance in implementing the Secretary's guiding principles requires improvement, although the Office of Oversight's initial evaluation in 1995 indicates an improving trend.

Needed actions include clearly defining roles and responsibilities, compelling management accountability, developing adequate authorization bases, and assuring the competence and qualifications of the work-force.

Actions needed to achieve line management responsibility and accountability are the implementation of the FAR Manual, or an alternate definition of DOE's roles and responsibilities, and the institutionalization of work practices that compel management accountability for safety and security. Obvious weaknesses remain in implementing the Secretary's second guiding principle, not only in promulgation and communication of requirements and policies, but in adherence to them. Most significant, however, is the lack of current, documented authorization bases needed to conduct operations and maintenance, implement physical modifications, evaluate facility conditions and operational incidents, and prepare facilities for decommissioning. This basic lack of understanding of facilities' current configuration and hazards increases the risk to workers from even routine activities. The Department is making efforts to remedy this situation by implementing a standards-based safety program approach. Finally, the most difficult aspect to evaluate and address is that of the qualifications and competence of DOE's

workforce. While DOE employs many competent personnel, there remain problems with matching personnel skills to tasks, providing training that fosters the maintenance and development of needed skills, and adequately addressing the issue of DOE's transitioning work and workforce.

In evaluating the performance of DOE in implementing the Secretary's guiding principles, the Office of Oversight also obtained considerable information regarding DOE's many individual programs. These programs are evaluated in Appendix C.

APPENDIX A

OFFICE OF OVERSIGHT PRINCIPAL ACTIVITIES AND REPORTS DURING 1995

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OFFICE OF OVERSIGHT PRINCIPAL ACTIVITIES AND REPORTS DURING 1995

Title of Activity or Report	Type of Activity
The Release of Nuclear-Related Property and Associated Documentation by the Department of Energy Since 1989	*Special Study*
Increasing Fissile Inventory Assurance Within the U.S. Department of Energy	*Special Study*
An Evaluation of Responses to the Secretary of Energy Memorandum on the Manual of Functions, Assignments, and Responsibilities for Nuclear Safety	*Review*
Independent Oversight Evaluation of Environment, Safety, and Health Programs at the Rocky Flats Environmental Technology Site	*Comprehensive Inspection*
Comprehensive Inspection of the Albuquerque Operations Office, Amarillo Area Office and Pantex Plant	*Comprehensive Inspection*
Independent Oversight Evaluation of Environment, Safety, and Health Programs at the Idaho National Engineering Laboratory	*Comprehensive Inspection*
Independent Oversight Evaluation of Safeguards and Security Programs at the Albuquerque Operations Office, Kirtland Area Office, and Sandia National Laboratory, New Mexico	*Comprehensive Inspection*
Special Radiological Surveillance at Los Alamos National Laboratory	*Review*
Emergency Management at Department of Energy Headquarters	*Review*
Oversight of Operational Readiness Reviews	*Review*
Independent Oversight Assessment of Radiological Protection Programs within the Department of Energy	*Review*
Initial Review of Hoisting and Rigging Incidents	*Special Study*
Independent Oversight Review of Potential Safety Concerns in Safeguards and Security	*Special Study*
Independent Oversight Special Study of Occurrence Reporting Programs within the Department of Energy	*Special Study*
Independent Oversight Special Review of the Molten Salt Reactor Experiment, Oak Ridge National Laboratory	*Review*
Type A Accident Investigation Board Report on the April 13, 1995, Security Rappel Tower Fatality at the Department of Energy Savannah River Site	*Review*
DOE Commitment to Defense Nuclear Facilities Safety Board Recommendation 91-6	*Review*
DOE Commitment to Defense Nuclear Facilities Safety Board Recommendation 94-4	*Review*
Independent Oversight Analysis of Suspect/Counterfeit Parts within the Department of Energy	*Review*
Site Resident Surveillances (203 during FY 1995)	*Surveillance*

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APPENDIX B

SAFETY MANAGEMENT PRINCIPLES AND CRITERIA

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SAFETY MANAGEMENT PRINCIPLES AND CRITERIA

PRINCIPLE NUMBER 1: LINE MANAGERS ARE RESPONSIBLE AND ACCOUNTABLE FOR SAFETY.

Criterion 1-1: Clear Safety Policies and Goals

Line management implements effective safety policy and goals that reflect Departmental policies and industry standards and assures a safety culture that permeates every level of the organization.

Criterion 1-2: Defined Responsibilities and Authorities

Line managers are responsible and accountable for ensuring that DOE facility operations and work practices are performed in a manner that provides adequate protection to worker safety and health, the public, and the environment. Accordingly, line managers must ensure that:

- A clear division of responsibilities is established and communicated.
- Line managers have the authority to make and implement decisions regarding environment, safety, and health (ES&H) that are commensurate with their responsibilities.
- There are clear mechanisms throughout the line organizations for adjudicating disputes among line managers where discrepancies are believed to exist between work goals and ES&H management needs.

Criterion 1-3: Project and Resource Management Systems

Decision makers at appropriate levels of the organization must be capable of understanding and synthesizing program goals and ES&H risks in order to effectively deploy resources adequate to address both. Line managers must manage safety and its attainment by establishing management information systems to ensure that:

- Hazards are analyzed and understood.
- Appropriate hazard mitigation actions are identified and are in place.

Criterion 1-4: Line Management Accountability for Performance

Line managers are accountable for ES&H performance. Performance should be explicitly tracked and measured, and inadequate performance should have visible and meaningful consequences. Line managers must execute actions to attain and continuously improve the safety of their operations by ensuring that:

- Safety-related matters are reviewed, monitored, and audited on a regular basis.
- Findings resulting from these reviews, monitoring activities, and audits are resolved in a timely manner.

PRINCIPLE NUMBER 2: COMPREHENSIVE REQUIREMENTS EXIST, ARE APPROPRIATE, AND ARE EXECUTED.

Criterion 2-1: Requirements Management

Processes must be in place to ensure that requirements are identified, transmitted, and implemented, and that they provide adequate protection to worker safety and health, the public, and the environment.

Criterion 2-2: Hazards Analysis

Hazards generally change as a facility cycles through the phases of design, construction, operation and maintenance, decommissioning and decontamination, and environmental restoration. It is thus important to continually analyze and assess hazards in order to identify the relative significance and application of Departmental requirements. To effectively mitigate hazards, line managers must ensure that:

- Requirements are established that are commensurate with hazards throughout the life cycle of the facility.
- Internal requirements are based on hazards analyses and, when implemented, are sufficient to ensure safety.
- Site-specific implementation plans and associated operating procedures define standards that will be used to comply with applicable safety requirements.
- The site is in compliance with applicable Federal and state statutes and Departmental policy and requirements.

Criterion 2-3: Implementation of Requirements

Line managers are responsible for ensuring that programs are implemented in compliance with defined requirements.

Criterion 2-4: Assessment Programs

Line management must establish and implement effective methodologies to monitor, review, and evaluate adherence to all applicable Departmental requirements and industry standards for safety and to achieve timely correction where warranted.

PRINCIPLE NUMBER 3: COMPETENCE IS COMMENSURATE WITH RESPONSIBILITIES.

Criterion 3-1: Staffing and Qualifications

The organization supports effective safety management by assuring appropriate levels of staffing and competence at every level. The organization has in place the means to:

- Determine the appropriate levels of staffing, experience, and training for each function, including consideration of responsibilities, activities, hazards, and schedules.
- Assure that subcontractors employed on site are adequately trained and qualified on job tasks, hazards, and Department and contractor safety policies and requirements.
- Clearly identify vertical and horizontal lines of interface, communication, and support.
- Provide managers and supervisors with sufficient authority, staffing, and support to implement assigned responsibilities, analyses, and decisions.
- Develop and implement strategies for recruitment and retention of competent personnel.

Criterion 3-2: Technical Competence and Knowledge of Hazards

Workers and managers are technically competent to perform their jobs and are appropriately educated and knowledgeable of the hazards associated with site operations. Line managers must ensure that:

- Workers have the technical capability to recognize and respond appropriately to workplace hazards.
- Management, technical staff, and workers have the necessary levels of education, training, and experience.

Criterion 3-3: Worker Participation and Empowerment

Line managers recognize that active participation by workers is essential in maintaining and improving protection of worker safety and health, the public, and the environment. Therefore, line managers must ensure that:

- Workers and managers are empowered to take appropriate action in the face of hazards encountered during normal and emergency conditions, including the right to refuse unsafe work assignments.
- Processes for raising safety issues are established.
- Incentives are in place to promote a safety-conscious culture and worker participation and involvement in safety management.

Criterion 3-4: Training Programs

Line managers must establish and implement processes to ensure that training programs effectively measure and improve performance, and identify additional training needs.

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APPENDIX C

INDIVIDUAL PROGRAM CONCLUSIONS

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INDIVIDUAL PROGRAM CONCLUSIONS

Safety programs evaluated by the Office of Oversight include worker safety, radiological protection, waste management, nuclear criticality, maintenance, conduct of operations, configuration management, fire protection, and quality assurance. The Office of Oversight also evaluates safeguards and security programs. A brief discussion of each is provided below.

Over the past year, the Department of Energy (DOE) has become more sensitive to the need to implement programs and controls to address worker safety issues. This can be seen in the upgrading of analyses to include hazards to workers and the realization by DOE that many of DOE's new missions, such as decontamination and decommissioning, pose hazards that differ from those of operations, and are likely to affect onsite rather than offsite populations. At several sites, strong support for worker safety was evidenced by management efforts to maintain highly qualified personnel in industrial hygiene and industrial safety. While the dedication to having qualified personnel in these areas was noteworthy, the use of these resources to support field activities was often misguided; in many cases these personnel were spending an inordinate amount of time on paperwork rather than on the "facility floor."

The implementation of radiological protection controls is somewhat inconsistent across the DOE complex. In most cases, qualified personnel are available, yet implementation of these controls is sometimes weak. Instances of inappropriate dosimetry use, inadequate postings identifying contaminated areas, and inappropriate storage of radiological materials indicate a need for a more disciplined approach to radiological controls. Notwithstanding these problems, facilities with disciplined operations also showed excellent radiological controls.

The Department continues to need improvement in waste management. Many of its ongoing efforts to characterize large backlogs of waste have yielded some benefits, yet these efforts are only a small portion of what remains to be accomplished. Weaknesses within the waste management program include the implementation of waste minimization efforts and the potential inability of DOE to certify some wastes for disposal. Nuclear criticality safety within DOE has been less than adequate as a result of some difficult problems that show no promise of disappearing in the near term. Many facilities have equipment that is so degraded that administrative controls are relied upon for adequate criticality protection. This problem is further exacerbated by the loss of most of the personnel qualified in this area, and the belief by many that in non-operating facilities criticality safety is a low priority.

Many facilities throughout the DOE complex contain equipment that is degraded, obsolete, and difficult to repair or replace. Many of these facilities also contain equipment that is difficult to access for repair or even to test to assess when repairs are needed. These issues, combined with the need to identify system configurations routinely before most repairs can be completed, have contributed to a large maintenance backlog across the DOE complex. Systems requiring repair include safety equipment as well as equipment relied on for personnel protection. Inadequate maintenance could allow facilities to operate outside analyzed conditions.

DOE's performance in conduct of operations and configuration management is plagued by the same problem, a lack of understanding of the current facility hazards and configuration. This is seen in inadequate procedures that are based upon incomplete and inaccurate drawings. These inaccuracies force many field personnel to make do with existing information and encourage "work-arounds" as a means of completing tasks. While this approach appears to address short-term needs, it discourages the implementation of disciplined work processes guided by procedural controls and operational limits. These less disciplined methods are evidenced in poor lockout/tagout controls, inadequate work planning, and ineffective communications. In some cases, these problems have resulted

in personnel injury. Most problematic in the area of configuration management is DOE's continued lack of an approach to documenting even new work, such as design modifications, field changes, and temporary modifications. This problem is never more egregious than in DOE's activities to construct new facilities. There continue to be instances of facilities being turned over for operations without appropriate as-built drawings, thereby making design reconstitution an issue even prior to operational use.

Fire protection, like criticality safety, is diminished by the degraded condition of equipment within DOE facilities. This has resulted in an overreliance on administrative controls as a substitute for detection and mitigation systems. Still, many of the fire protection professionals within DOE were found to be qualified and competent. At facilities where fire was considered a dominating hazard, or the consequences of a fire a dominating means of hazardous material dispersion, fire protection programs were complete and well executed.

Quality assurance requirements for DOE have been promulgated in rulemaking. However, the adequate implementation of these requirements across DOE is not always evident. The evaluation of internal safety programs by quality assurance personnel is one area requiring improvement.

In the past, safeguards and security have received a great deal of management and Congressional emphasis. The results of this emphasis are being realized through improved safeguards and security program performance by DOE. Physical protection of special nuclear material against terrorist actions is robust and in marked contrast to the deficient situation in the early 1980's. However, the overall protection program effectiveness and efficiency that should have been achieved by formalizing the Site Safeguards and Security Plan has not been realized. In the area of requirements, problems remain as evidenced by site safeguards and security plans that do not adequately incorporate risk and consequence measures. One area of increasing concern is information assets – especially sensitive unclassified information – which continue to show demonstrable vulnerabilities; and while recent policy initiatives have begun to incorporate sensitive unclassified information under a general information security umbrella, implementation of this policy in the field is not evident.